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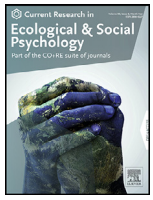

Shifts in ecology, behavior, values, and relationships during the coronavirus pandemic: Survival threat, subsistence activities, conservation of resources, and interdependent families ☆

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ABSTRACT

What are the psychological effects of the coronavirus pandemic? Greenfield's Theory of Social Change, Cultural Evolution, and Human Development predicts that when survival concerns augment, and one's social world narrows toward the family household. life shifts towards activities, values, relationships, and parenting expectations typical of small-scale rural subsistence environments with low life expectancy. Specific predictions were that, during the pandemic, respondents would report intensified survival concerns (e.g., thinking about one's own mortality); increased subsistence activities (e.g., growing food); augmented subsistence values (e.g., conserving resources); more interdependent family relationships (e.g., members helping each other obtain food); and parents expecting children to contribute more to family maintenance (e.g., by cooking for the family). All hypotheses were confirmed with a large-scale survey in California (N = 1,137) administered after about a month of stay-at-home orders during the coronavirus pandemic; results replicated in Rhode Island (N = 955). We posited that an experience of increased survival concerns and number of days spent observing stay-at-home orders would predict these shifts. A structural equation model confirmed this hypothesis.

1. Introduction

Our goal is to use Greenfield's Theory of Social Change, Cultural Evolution, and Human Development (Greenfield, 2009, 2016, 2018) to predict and test the shifts in values, concerns, activities, relationships, and learning environment that took place after stay-at-home orders in the wake of the COVID-19 pandemic.

1.1. Theory of Social Change, Cultural Evolution, and Human Development

Greenfield's theory provides a unified framework for exploring cultural and psychological implications of sociodemographic change. This multilevel and interdisciplinary theory incorporates sociodemographic variables at the top level (rooted in Tönnies, 1887/1957), cultural variables at the next level down, and more traditional psychological variables at the lowest levels of behavior and learning environment. The theory posits a causal chain from the top sociodemographic level to cultural values, behavior, and relationships (Greenfield, 2009, 2016, 2018). Therefore, changes in sociodemographic ecologies have widespread effects on cultural values, behavior, and relationships. As a consequence, observing and measuring sociodemographic changes can be used to understand and predict changes in cultural values, behavior, and relationships.

Applied to the pandemic, the theory predicted that, as the ecology shifted and survival concerns mounted from a combination of COVID mortality, loss of livelihood, reduced social contacts with strangers and acquaintances, combined with intensified social contact with one's family/household and neignbors, there would be a number of downstream adaptations in concerns, behavior, values, and relationships. We predicted that mortality would become an increasing concern, subsistence activities (e.g., growing vegetables, preparing food) would become more frequent, values would move toward those adaptive in a subsistence ecology, and family relationships would become more interdependent - in everyday activities, in the social and paractical help family members provide one another, and in parents' expectations of their children. The rationale for these predicted shifts can be best understood if we begin by describing the basic ecological dimension.

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1.2. Sociodemographic ecologies

The most basic distinction at the sociodemographic level is between subsistence and commercial ecologies. Subsistence ecologies are characterized by small villages, short life- expectancy (including high infant mortality rate), low material resources, little access to science-based health care, and basic survival activities - people produce their own food, shelter, and clothing. They also feature small stable communities with little or no contact with the outside world. In Tönnies' theoretical framework, these are summarized by the term *Gemeinschaft,* usually translated as "community" (Tönnies, 1887/1957).

In commercial ecologies - a product of cultural evolution - most people live in urban environments; people have higher life expectancies, greater material resources, frequent contacts with strangers and the outside world; and they purchase rather than produce food, shelter, and clothing. In Tönnies's (1887/1957) theoretical framework, these are summarized by the term *Gesellschaft,* usually translated as "society."

1.2.1. Social change

In cultural evolution, human ecology has shifted from subsistence to commerce. Subsistence ecologies based on hunting and gathering constituted the environments in which modern human beings evolved about 200,000 years ago (Wilson & Cann, 1992). Human agriculture began about 23,000 years ago (Snir, et al., 2015). In these subsistence ecologies life expectancy was short; survival threats were many.

In the initial movement toward a commercial economy, the first use of money began about 2600 years ago (Velde, 1998); paper money was introduced about a thousand years ago (Headrick, 2009). Subsistence farming disappeared as commerce and urban living expanded (e.g., Chen et al., 2014). Life expectancies increased as medicine and science advanced (Roser et al., 2013/2019).

Even today, ecologies are far from static. The dominant direction of social change in our globalized world has been towards ever greater commercialization, wealth, and monetization of activity. Movement towards a more commercial and wealthy ecology brings with it more individualistic values (Santos et al., 2017), reduced survival concern (LeVine, et al., 1994), fewer subsistence activities (Greenfield, 2004); less family interdependence (Greenfield, Maynard, & Childs, 2003); and elimination of subsistence chores in children's learning environments (Maynard et al., 2015; Whiting, 1996).

However, social change can go in the opposite direction as it did in both the Great Depression and the Great Recession. As wealth decreased in the Great Recession, values became more communitarian and there was more concern about conserving environmental resources. Young people became more concerned about having a job but less concerned about becoming rich (Park et al., 2014). In the Great Depression, subsistence chores for girls in the home environment increased (Elder, 1974). However, the most basic aspect of a subsistence ecology is survival threat.

1.2.2. Social and ecological change in the pandemic

The stay-home orders and elevated mortality associated with COVID-19 replicate many elements of subsistence ecologies. For example, home as the base for economic activities and home as children's basic learning environment are features of a Gemeinschaft lifestyle (Greenfield. 2009;). Gemeinschaft environments, common in early human history, also have low life expectancy with high infant mortality (e.g., Brazelton, Robey, & Collier, 1969). Over human history, death rates have steadily decreased (Cole, 2019).

However, in the pandemic, survival threats greatly increased. At the time of our study, the United States had seen 5.67 million cases with more than 176,000 deaths (Center for Systems Science and Engineering at Johns Hopkins University (n.d.)). Compounding survival threat inherent in these statistics, hospitals became overburdened; there was a shortage of personal protective equipment; no specific cure for COVID-19 exists; there was, at the time of our study, no vaccine; large numbers of carriers are asymptomatic; and the novel coronavirus is highly contagious, even before symptoms show up.

Under these conditions, preventative behaviors are the only defense; and stay-at-home orders were given by governors of various states. Stay-at-home makes it harder to obtain food and other survival needs, like medical care; it contracts one's in-person social and geographical universes.

Millions have lost gainful employment. In California, the unemployment rate was 4.2% in April 2019, By April 2020, the month in which the survey was taken in that state, the rate had risen to 18.1% (California Employment Development Department, 2020). In Rhode Island, our replication state, the story was similar. In May of 2019, the unemployment rate was 3.6%, By May of 2020, the month our survey was taken in Rhode Island, the rate had risen to 16.3% (Rhode Island Department of Labor and Training, 2020).

Subsistence concerns have multiplied to unheard of dimensions in the United States, as societal wealth has radically decreased, with millions of people out of work and millions trying to avoid getting sick and dying from COVID-19.

In response to the pandemic, stay-at-home orders recognized the danger of in-person commercial or professional interactions; they reduced the expanse of people's social environment in the direction of a village ecology - facilitating relations with neighbors, while making in-person contact with distant others impossible. Thus we can see many elements of subsistence ecologies mirrored in the societal changes which occurred during the COVID-19 pandemic.

1.3. Adaptations to subsistence and commercial ecologies

Greenfield's theory makes predictions about how ecological and sociodemographic factors affect concerns, activities, values, relationships, and learning environment. The increase in subsistence related ecologies linked to COVID-19 should lead to predictable adaptations. These predictions and the empirical evidence for them are summarized in the following subsections.

1.3.1. Mortality

We.posit that high mortality rates create survival concerns and make mortality important in community practices. For example the Zinacantec Maya community of Nabenchauk in the Mexican state of Chiapas exemplifies community response to high mortality and low life expectancy in a subsistence environment. In the 1960s, about 35% of children died before age 4 (Brazelton, Robey, & Collier, 1969). Death was very much a part of life, and people would visit family graves every Sunday, bringing food to feed the souls of their deceased family members (Greenfield, 2004). We see this elaborate cultural structuring of death as a product of high mortality rates and low life expectancy. However, as the Zinacantec environment shifted in the Gesellschaft direction, moving from a more subsistence-based ecology to a more commercial ecology, including greater access to medicine-based health care, mortality became less important in community practices. For example, people no longer visited family graves every Sunday, but instead used the day to see friends and enjoy themselves (Greenfield, Maynard, & Martí, 2009)

In general, environments with lower mortality rates reduce the emphasis on mortality in community practices. For example, in the United States preCOVID, focus on a dead body was often minimized through cremation rather than burial, and memorial services, which, by definition, do not include the body, are often structured as celebrations of life rather than opportunities to grieve over death (Evers et al., 2021).

Thus, in the context of COVID-19, increased mortality rates should make people aware of their mortality and increase concerns around their own death and the death of their family members; that is survival concerns should increase. Because such concerns are typically associated with subsistence ecologies, they provide evidence for adaptive shifts in the Gemeinschaft direction during the COVID-19 pandemic, adaptations which should in turn influence behaviors and values in important ways.

The term mortality salience was introduced as a central component of Terror Management Theory (Greenberg et al., 1992). In a prior publication on the effects of COVID-19 on online behavior, we used the term "mortality salience" to describe increases in the online frequency of terms such as "death" and "cemetery" after Trump's COVID emergency declaration(Evers et al., 2021). Because of the nature of the items used in the survey reported here (e.g., "I am thinking about making plans for when I die"), we use the term "survival concerns" and see survival concerns as a subset of the more general concept, "mortality salience." In our Discussion, Section 4.1.1, we compare and contrast our approach with that of Greenberg and colleagues.

1.3.2. Activities

In a Gemeinshaft ecology with high mortality rates and social contacts limited to family and community, activities center around subsistence needs: food, shelter, clothing. Examples are found in many ethnographic field studies (e.g., Bowser & Patton, 2008; Hewlett et al., 1998; Vogt, 1969). In a commercial ecology subsistence needs are most often purchased. A shift toward a Gemeinschaft ecology with greater danger of death and a much restricted social world during the COVID-19 pandemic and stay-at-home orders should mean that people are spending more time engaging in subsistence activities like growing food and taking care of their homes

1.3.3. Values

There is a continuum of values in which groups who are closer to a subsistence village ecology have stronger values for conservation of resources, greater appreciation of family and older people, less concern with accumulating wealth, along with greater concern about having enough resources for basic subsistence needs such as food and shelter. In contrast, urban groups at a higher socioeconomic level participating in commercial ecologies have less concern about conserving resources, weaker family values, are more child-centered, have less concern about basic material resources, and are more motivated to accumulate wealth (Bolin, 2006; Greenfield, 2004, 2013; Manago, 2012; Park et al., 2014; Weinstock, 2015). Thus, in the context of COVID-19, we expect that values will shift to place more importance on conserving resources, more importance on money as a source of survival rather than wealth, and increased importance of both family and the elderly.

1.3.4. Acceptance of authority

Acceptance of authority is also an important aspect of subsistence ecologies. In subsistence ecologies respecting authority, whether from community leaders or parents, is an important organizing principle of these groups (Bolin, 2006; Edwards, 1997). In commercial ecologies, respecting authority is less necessary for survival and thus a less strict norm in these societies. In the context of the pandemic, Gelfand (2020) has pointed to the willingness to accept authority as an important cultural feature promoting a society's ability to control community spread of COVID-19. She calls this concept tightness; it will be discussed in greater depth in the Discussion section. In the current study, we expect shifts toward greater acceptance of authority based on increased survival threats in the COVID context.

1.3.5. Forms of family interdependence

On the continuum from subsistence to wealth and commerce, family interdependence is stronger where subsistence concerns are greater. This difference in family relations can be seen in the contrast between more interdependent members of working-class immigrant Latinx families and more independent members of middle-class European American families in Los Angeles (e.g., Greenfield & Quiroz, 2013; Raeff et al., 2000).

Several aspects of anthopologist Robert Redfield's (1941) concept of folk society, a strictly subsistence ecology, are relevant to implications of the pandemic for social relations: "To Redfield, the folk society is a small collectivity containing no more people in it than can know each other well. It is an isolated nonliterate, homogenous grouping with a strong sense of solidarity….Kinship … is central to all experience, and the family is the unit of action." (McKinney & Loomis, 1957, pp. 15-16). Hence, the isolation of family households during the pandemic led to the prediction of increased family interdependence, including spending more time eating and talking with family members and increased helping behaviors within the family.

1.3.6. Learning environment and family maintenance

In a subsistence ecology with high mortality rates, we find the pediatric model of child development, in which child survival and children learning survival skills at home is the utmost concern (LeVine et al., 1994). Children contribute to the family by learning how to carry out activities like cooking, taking care of younger members of the family, making clothing, and housework - what Lancy (2012) calls the "chore curriculum." In subsistence communities, a transition to contributing to household chores occurs between ages five and seven (Weisner, 1996). By age seven children in 25 out of 36 cultures, mainly rural nonliterate societies, were expected to help with household chores (Rogoff et al., 1975).

In commercial ecologies, the pedagogical model is observed where children's achievement in formal education is at the center of parental concerns (Cleghorn and Prochner, 2003; LeVine et al., 1994; Whiting, 1996). Children learn at school, rather than at home, and their main responsibility is to do well at school (Lancy, 2012; Park et al., 2020). In these ecologies, the traditional time to start serious schooling has always been between ages five and seven; at this same age children in subsistence environments are expected to help with essential chores (Rogoff et al., 1975).

In the context of COVID-19 and stay-at-home orders which moved education into the home, we expected parents to have greater expectations for children to help with household chores, such as cleaning, meal preparation, and laundry. To a lesser extent and less theoretically central, we expected children to contribute to the household indirectly by being able to do more to maintain themselves - preparing their own meals, cleaning their own rooms, and doing their own laundry - thus relieving their parents to some extent of the need to do these tasks..

1.4. Current study

The COVID-19 pandemic is a survival threat on a mass scale. The tragedy of the pandemic was accompanied by changes in social ecology – notably the isolation of household units. We expected that these changes would be accompanied by wide-ranging effects on values, behaviors, and childrearing. Our main goal was to test whether our theoretical framework could accurately predict shifts in these areas. COVID also provided an ecologically valid opportunity to model the behavioral and psychological implications of increased survival concerns and narrowing of the social world to the family household. Therefore, a related research goal was to use our theoretical framework to model the joint effects of survival threats and stay-at-home orders on concerns, activities, values, relationships, and parenting.

1.5. Hypotheses

As a function of these sudden ecological changes in mortality and relationship to home, Greenfield's theory predicts that concerns, activities, values, relationships, and children's learning environments will move towards those found in small, socially isolated, rural villages with subsistence ecologies and low life expectancy.

1.5.1. Hypothesized shifts

The theory yielded a set of hypotheses concerning effects of the coronavirus pandemic and stay-at-home orders. Each shift was first assessed in California, then tested for its replicability in Rhode Island. The predicted shifts were as follows:

Survival concerns will become greater, as the in-person social world contracts, in many cases, to the family household.

Subsistence activities such as growing food, food preparation, and home maintenance will increase.

Acceptance of authority of the government to control behavior will increase.

Subsistence values, that is, values adaptive in a subsistence ecology, will grow stronger: conservation of resources; money as a survival tool rather than a way to become rich; importance of family and elders.

Family interdependence will increase in a number of respects:

Family activities will increase: household members will spend more time conversing and eating together.

Providing practical and social help to family members will increase.

Receiving practical and social help from family members will increase.

We based these seven variables and the items comprising them on exploratory factor analysis of the entire two-state sample of 2,092 respondents. Each factor was used to identify component items of a scale for each of the seven variables listed above. The component items of each scale are listed in the Method section, along with details of the factor analysis.

Parent expectations: We predicted that parents would expect children to make greater contributions, primarily to household subsistence and secondarily to their own maintenance by helping with cooking, cleaning, and laundry. This hypothesis was tested by a parent subsample in each state. The grouping of items into scales is based on the theoretical analysis presented earlier, supplemented by a correlational analysis described below.

1.5.2. Hypothesized model

Based on the above theoretical discussion, two variables were used as predictors of the scales used in the whole-sample analysis. We predicted that increased **survival concerns**, as well as response to stay-at-home orders (**number of days at home**), would predict the experience of increases in subsistence activities, acceptance of authority, subsistence values, and the three forms of family interdependence. Note that the experience of augmented survival concerns during the pandemic was used as a stand-in for increases in actual mortality produced by the pandemic. Number of days at home was used to measure a narrowing social world. These two variables were treated as predictors in our structural equation model.

2. Method

2.1. Design

Our sampling unit was the state. Our rationale was that a key goal was to assess the effect of coronavirus stay-at-home policies and, in the United States, these took place on the state level. The first state in which we carried out the survey was California. In order to increase generality, we then selected a contrasting replication state, while keeping the number of days under a stay-at-home order the same for the replication. The replication state was Rhode Island. In both states, residents had lived under a stay-at-home order for 34 days when the survey began.

California and Rhode Island contrast on a number of demographic variables. This was an intentional choice, as the replication in an ecologically different state would be a strong indication of generalizability of our findings in the United States. California is the largest state in the United States, with a 2020 population of 39,937,500 (World Population Review (n.d.)). Rhode Island's population was in 2020 only 1,056,160, 2.6% of the California population (World Population Review (n.d.)). The two states are in contrasting geographical regions: California is on the Pacific coast of the United States; Rhode Island is on the Atlantic coast.

Most directly pertinent, California had, at the time of data collection, a COVID-19 case rate below the national average (139 per 100,000) and a relatively low COVID-19 mortality rate (6 per 100,000). In sharp contrast, Rhode Island's COVID-19 case rate was more than six times the California rate: 895 per 100,000 of population. Rhode Island's COVID-19 mortality rate was five times California's: 30 per 100,000 people (all statistics as of 5/4/2020 [Statista (n.d.)]).

2.2. Participants

Our California sample consists of 1,137 participants living in the state. Sampling residents of one state enabled us to control timing in terms of participants' experience with self-isolation, an important feature of study design. The average age was 61.66 (SD = 12.59), with a range from 18 to 90. Of the 841 participants who reported their highest level of education, 6.9% reported high school, 24.9% reported community college, 27.1% reported 4-year college, and 41.1% reported postgraduate education. Of the 1132 Californians who provided information on their residence, 21.3% resided in rural parts of the state; 53.9% lived in urban areas; and 24.8% were living in the suburbs. Of the 1126 participants who provided information on their ethnic identity, the composition of the sample was 79.9% European American, 3.1% Latinx, 2.8% Asian American, 1.2% African American, 1.1% Native American, 0.4% Pacific Islander, and 11.4% "other". In comparison to California as a whole, this sample far overrepresents European Americans (California was only 37% White in 2018) and even more severely underrepresents the Latinx population (California was 39% Latinx in 2018). African Americans (6% of California in 2018) and Asian Americans (15% of California in 2018) are also underrepresented in our sample.

The Rhode Island sample consisted of 955 participants living in Rhode Island. The average age was 56.19 (SD = 14.05) with a range of 18 – 96. Concerning education 9% of 954 respondents had attended high school, 18% had attended community college, 31.8% had attended 4-year college, and 41.2% had some postgraduate education. Of the 951 participants who responded to the question on residence, most lived in suburban (43.1.%) and urban (37.4%) areas. Only 19.5% of the sample lived in rural areas. Of the 931 Rhode Islanders who provided information about their ethnic identity, the sample was mainly European American (84%). 1.3% was Latinx, 1% was African American, 1% was Native American, 0.6% was Asian American, and 0.1% was Pacific Islander. This distribution closely mirrored the ethnic distribution of the state. 12% of the sample responded "other."

We planned in advance to make the survey available in both states for seven days and to use whatever sample we acquired in that time period. The analyses reported here include all participants filling out the survey in the specified time period who responded that they were living in California during the California survey or in Rhode Island during the Rhode Island survey.

One goal was to explore how the experience of coronavirus and stay-at-home had affected parent behavior and intergenerational relations. In order to analyze shifts in children's learning environments, more specifically parents' expectations concerning children's contributions to family subsistence tasks, we created subsamples for these analyses of respondents with children between 7 and 18 years of age who were living at home. The age of seven was in line with the age discussed above at which children in village ecologies around the world begin to contribute to subsistence tasks needed by their families. In California, 109 respondents with at least one child between 7 and 18 years of age living at home provided data on parental expectations. In Rhode Island, 148 respondents with at least one child between 7 and 18 years of age living at home provided data on this topic.

2.3. Procedure

The survey and recruiting procedure were approved by the UCLA Institutional Review Board.

2.3.1. Timing of the survey: California

In California, the survey was first posted online on April 22, 2020, the 34th day of stay-at-home. As planned in advance, our sample filled out the survey over a period of seven days. On March 4, 2020, Governor Gavin Newsom announced a state of emergency due to COVID. On March 16, 2020 the California Department of Public Health recommended self-isolation for older adults and those with elevated risk - individuals over 65 and those with serious chronic medical conditions, such as heart disease, diabetes, lung disease, or compromised immune systems. On March 19, 2020, Governor Newsom issued a general stay-at-home order with no end date. Participants filled out the survey while the stay-at-home order was in effect. 93.4% reported having self-isolated for at least some period of time and 91.8% were still self-isolated when they took the survey. Excluding outliers, we found that the average number of days that they had been self-isolated was 34.49 (SD = 13.03 days). The range was between 0 and 56 days. 80.8% of participants reported having been self-isolated for 34 or more days suggesting that the majority of our sample had been following the suggested stay-at-home guidance. (The operationalization of outliers is explained in Section 2.4.1 below.)

2.3.2. Timing of the survey: Rhode Island

In Rhode Island the survey was first posted online on May1, 2020, the 34th day of stay-at-home. Again our sample filled out the survey over a period of seven days. Rhode Island Governor Gina Raimondo announced a state of emergency on March 9, 2020. She followed up with a stay-at-home order on March 28, 2020. As in California, the first respondents had already lived under the stay-at-home order for 34 days, and all respondents took the survey while the stay-at-home order was in effect. 91.3% reported having self-isolated for at least some period of time; 86.4% were still self-isolating at the time they took the survey. Excluding outliers, the average number of days that they had been self-isolated was 38.26 (SD = 17.64 days), with a range between 0 and 60 days. Most had been self-isolating for 34 or more days (83.4%).

2.3.3. Recruitment

We used Facebook as our recruiting platform. The overwhelming majority of participants were recruited by means of Facebook ads that targeted people living in California or Rhode Island. A minority were recruited through posts on individuals' Facebook pages or Facebook groups in each state.

2.4. Survey instrument

As an introduction to the survey questions, an information sheet informed participants that: "We are studying how Californians' [Rhode Islanders'] lives have changed since the coronavirus outbreak. We want to know what life has been like since the Governor's stay-at-home-order." The survey began with questions about self-isolation and family composition including the number of children respondents had, their ages, and whether their children were living at home. It then moved to questions about differences in life before and after the coronavirus pandemic and the governor's stay-at-home order. Basic demographic questions including gender, age, rural or urban setting were placed at the end.

Note that this survey is geared towards uncovering respondents' experience of the shifts that COVID has produced in their lives. Their reports of this experience occur at one point in time. Because the survey was given about a month after the governor's first stay-at-home order, the experience of life in the pandemic and the contrast with prior lives was very fresh at the time they took the survey. Hence, it is more a measure of ongoing experience than it is a retrospective measure.

All questions used in the present article are shown in Table 1. Other questions were used with the same sample of participants from California and Rhode Island in a study of shifts in communication technology use during COVID and the connection of these shifts to well-being (Brown & Greenfield, 2021).

2.4.1. Stay-at-home

The stay-at-home variable was number of days the respondent reported being in social isolation. In each state, the maximum number that was used was the number of days from the day the governor of that state declared a state of emergency to the day the respondent took the survey. In California, this maximum was 49 days if they took the survey on the first day, April 22, to 56 days if they took the survey on the last day, April 29. In Rhode Island this maximum ranged from 53 days if they took the survey on the first day, May 1, to 60 days if they took the survey on the last day, May 8. Anything beyond that number was considered an unrealistic outlier and treated as missing data in order not to unbalance the stay-at-home variable at the high end.

2.4.2. Scale anchors for value and behavior items

Our alternatives of less, same, and more (and their variants shown in Table 1) can be considered a Likert-like scale with three ordered points (McLeod, 2019). Standard Likert scales having five or seven points are inherently ambiguous, particularly at the midpoint (Hodge and Gillespie, 2008). The meaning of our three scale points, including the midpoint, is unambiguous. Items with fewer response alternatives can be completed more quickly; and, with fewer response alternatives, more of the scale is used (Matell & Jacoby, 1972). Although three alternatives are fewer than commonly used in Likert-like scales, "both reliability and validity are independent of the number of scale points used for Likert-type items" (Jacoby & Matell, 1971, p. 498). More specifically, Jacoby and Matell provide evidence that three-point Likert scales – which we are using - suffice because the directional component (rather than distance) accounts for the overwhelming majority of variance. However, note that bootstrapped t-tests were not carried out on individual items, but on scales based on the exploratory factor analysis, to be described next. Each scale had a score range of between 5 and 11 points, depending on the number of items in the latent variable identified in the factor analysis.

2.4.3. Factor analysis of whole sample and creation of scales

In addition to showing individual items, Table 1 also depicts the seven item groupings that were identified through ordinal exploratory factor analysis using Varimax rotation of the total sample (N = 2092). Based on the seven latent constructs that emerged from the factor analysis of the Likert-scale data, we calculated the following seven scales: survival concerns, subsistence activities, subsistence values, respect for authority/tightness, interdependent family activities, family helping respondent, and respondent helping family. Scales for parent expectations were developed out of theoretical considerations and correlational analysis to be described below.

In each scale, every item was centered at 0: 0 meant no change; +1 meant that an increase was experienced during the pandemic; -1 meant that a decrease was experienced during the pandemic. Scales were created by adding together the item scores comprising each factor. This addition yielded measures of net change. For example, if a participant reported helping family with daily practical needs more during the pandemic than before (+1) but helping them less with daily social needs (-1), the net change for the respondent-helping-family variable would be zero, no change. Depending on how many items were identified in the factor analysis for a particular concept, our scales had from 5 to 11 points. In the rare cases of missing items within a scale, the answered items are summed. In the rare cases where no item in a scale was responded to by a participant, sample size is slightly reduced, and degrees of freedom in the bootstrapped t-tests, explained in Section 2.5.1, can therefore vary very slightly from scale to scale.

Each scale depicts a cultural element that is important in a subsistence ecology. Scales developed in this way were as follows:

2.4.3.1. Survival concerns. The survival concerns scale has four items: thinking about the mortality of oneself, thinking about the mortality of

Table 1
Survey questions and response options, with predicted shifts during COVID-19 bolded.

Question	*Response options*
Stay-at-home compliance and family composition	
Have you and/or your household practiced self-isolation and/or stay-at-home?	Yes; No
How many days have you been staying at home/self-isolating?	Open-ended
Do you have children?	Yes; No
How many children do you have?	Open-ended
What are your children's ages?	Open-ended
Do you have grandchildren?	Yes; No
Survival Concerns	
Compared with before the coronavirus, I am thinking about my mortality…	**More**; No change; Less
Compared with before the coronavirus, I am thinking about the mortality of my family members…	**More**; No change; Less
Compared with before the coronavirus, I am now thinking about making concrete plans for when I die (ex. Making a will or trust, where I would like to be buried or cremated)…	**More**; No change; Less
Compared with before the coronavirus, I am now thinking about whether my family members have made concrete plans for when they die…	**More**; No change; Less
Government Authority	
My acceptance of the government restricting my own movement has become…	**Greater**; Less; No change
My acceptance of the government restricting everyone's movement has become…	**Greater;** Less; No change
Subsistence Values	
Since the stay-at-home order, having enough money to satisfy basic needs (food, shelter) has become…	**More important**; Same importance; Less important
Since the stay-at-home order, not wasting scarce resources has become…	**More important**; Same importance; Less important
Since the stay-at-home order, becoming rich has become…	More important; Same importance; **Less important**
Since the stay-at-home order, my appreciation of elderly people has…	**Increased;** Decreased; Stayed the same
Since the stay-at-home order, my appreciation of my family has…	**Increased;** Decreased; Stayed the same
Subsistence Activities	
Since the stay stay-at-home order, I spend time cooking…	**More now**; No change; Less now; I did not do this before and I still do not do it now*
Since the stay-at-home order, I spend time growing edibles like vegetables or herbs…	**More now**; No change; Less now; I Did not do this before and I still do not do it now*
Since the stay-at-home order, I spend time doing home maintenance…	**More now**; No change; Less now; I did not do this before and I still do not do it now*
Family Interdependence	
Since the coronavirus outbreak, eating with other members of the household has become…	**More frequent;** Less frequent; No change
Since the coronavirus outbreak, talking with other members of the household has become…	**More frequent;** Less frequent; No change
Family Help to Respondent	
Concerning my family's role in meeting my daily needs (food, shelter), I have become…	**More dependent on them;** Less dependent on them; No change
Concerning my family's role in meeting my social needs (conversation, comfort), I have become…	**More dependent on them**; Less dependent on them; No change
Respondent Help to Family	
Concerning my role in providing for my family member's daily needs (food, shelter), I am doing…	**More for them than before;** Less for them than before; No change
Concerning my role in providing for my family member's social needs (conversation, comfort), I am doing…	**More for them than before**; Less for them than before; No change
Parent expectations of children's contribution to family maintenance	
Since the stay-at-home order, I expect my children (age 7 and up) to help with cooking for the family…	**More than before;** Less than before; No change; Not applicable because children are not living at home
Since the stay-at-home order, I expect my children (age 7 and up) to help with cleaning common areas of the home…	**More than before**; Less than before; No change; Not applicable because children are not living at home
Since the stay-at-home order, I expect my children (age 7 and up) to help do the household laundry…	**More than before;** Less than before; No change; Not applicable because children are not living at home
Parent expectations of children's contributions to self-maintenance	
Since the stay-at-home order, I expect my children (age 7 and up) to prepare some of their own meals…	**More than before;** Less than before; no change; Not applicable because children are not living at home
Since the stay-at-home order, I expect my children (age 7 and up) to keep their own rooms clean…	**More than before;** Less than before; no change; not applicable because children are not living at home
Since the stay-at-home order, I expect my children (age 7 and up) to do their own laundry…	**More than before;** Less than before; No change; not applicable - children are not living at home
Demographics	
What is your gender?	Male; Female; Other (open-ended)
What is the highest level of education that you have participated in?	Elementary school; Middle school/junior high; High school; Community college; 4-year college; Postgraduate
What is your ethnicity?	European American; LatinX; African American; Asian American; Native American; Pacific Islander; Other (open-ended)
How old are you?	Open-ended
What state do you live in?	Open-ended
Is your town a …	City; Suburb; Rural area

* Note: For the subsistence items, the alternative "I did not do this before and I do not do it now" was eliminated from the statistical analyses.

others, thinking about making concrete plans for when I die, and thinking about whether my family members have made concrete plans for when they die. All four items concern death-related thoughts and activities. The items were summed, with +1 used for experienced increase, -1 used for experienced decrease, and 0 used for reports of no change. This method created a 9-point scale of net change centered at zero and ranging from -4 to +4. Positive scores indicated an experience of increased survival concerns since the pandemic; negative scores indicated an experience of decreased survival concerns. Zero would indicate an experience of no net change. Here is an example of how the scale worked: if a participant reported an increase in all 4 items, their scale score would be +4. If they reported a decrease in all four items, their scale score would be -4. If they reported no change in any of the items, their scale score would be 0. Intermediate values were calculated in similar fashion, e.g., increase in 3 items with decrease in 1 would yield a net scale score of 2.

2.4.3.2. Subsistence activities. Three items form the subsistence activities scale: cooking, growing edibles, and doing home maintenance. All relate to providing the necessities of life. These items were summed as just explained to create a 7-point scale centered at 0 and ranging from -3 to +3, with scores above zero representing an experience of greater engagement in subsistence activities since the start of the pandemic and stay-at-home.

2.4.3.3. Subsistence values. This scale includes five values that are prevalent in subsistence ecologies: appreciation of family, appreciation of the elderly, not wasting scarce resources, high importance of having enough money to satisfy basic needs for food and shelter, low importance of becoming rich. Scores on these items (with importance of becoming rich reversed scored) were summed as explained in Section 2.4.3.1 to create an 11-point scale that could range from -5 to +5 with net scores above zero indicating an experience of increased subsistence values since the start of the pandemic and stay-at-home.

2.4.3.4. Family interdependence: activities. This factor consists of two items: eating with other household members and talking with other members of the household. These items were summed to create a scale ranging from -2 to +2 with positive values indicating a net increase during stay-at-home and the pandemic in family activities.

2.4.3.5. Family interdependence: Respondent helping family. This factor consists of two items. One concerns the respondent's role in providing for family members' daily needs for food and shelter. The other concerns the respondent's role in providing for family members' social needs for conversation and comfort. These two items were added together to create a scale ranging from -2 to +2, with values above zero indicating net increase during the pandemic in the experience of family members helping eachg other.

2.4.3.6. Family interdependence: Family helping respondent. This scale consists of two items. One item concerns the respondent's dependence on their family in meeting daily needs for food and shelter. The other item concerns the respondent's dependence on their family for meeting their social needs for conversation and comfort. The two items were combined to create a scale with a range of -2 to +2 with values above zero indicating that respondent has experienced a net increase in being helped by family members during the pandemic.

2.4.3.7. Acceptance of authority/tightness. This scale consists of two items. One item asks whether the respondent has become more accepting of government restrictions on their own movement. The other asked whether the respondent has become more accepting of government restrictions on everyone's movement. These two authority items were summed to create a scale ranging from -2 to +2 with values above zero indicating an experience of greater acceptance of government authority since the start of the pandemic.

2.4.4. Parent expectations for child maintenance and contributions to family subsistence

Because of very reduced sample size for our subsample of parents of children between 7 and 18 living at home, we used a different method to create variables for parent expectations. Two variables were created: parents' expectations of their children's contribution to family subsistence and parents' expectations of their children's contribution to self-maintenance. These two variables were treated as indices rather than scales.

The content validity of indices depends on underlying theory and prior research (Streiner, 2003). The content validity of our parent-expectation indices is based on the theoretically driven hypothesis that, during the isolation of households required by stay-at-home orders, expectations would move in the direction of the kind of contributions expected in a subsistence ecology (summarized in Section 1.3.6): parents would expect more of their children in terms of household contributions. We also expected, but to a lesser degree, that indirect contributions to family maintenance would take place in the form of increased expectations for children's self-maintenance.

Indices require defining characteristics (Streiner, 2003). For defining characteristics, one needs a census rather than a sample (Bollen & Lenox, 1991). Our census identified cooking, cleaning, and laundry as the main household tasks. These tasks can be done for the family as a whole or for oneself. Even in the latter case, though, they were an indirect contribution to family subsistence because when a child assumed responsibility for self-maintenance in any of these areas, a busy parent was relieved from having to help the child with these tasks.

2.4.4.1. Interrelations among the parent expectation items. Significant intercorrelations of the six parent expectation variables (Table 2) reflected, on the one hand, the fact that, in the case of laundry and cooking, one and the same activity could be used for family and self; this was most true for laundry where the child's own laundry could be mixed with family laundry, and the correlation of the two items was highest: Spearman r =.541. The Spearman correlations between shift in parent expectation for cooking for family and cooking for self was .445; between shift in parent expectations for cleaning common areas and cleaning one's own room, the correlation was .367.

On the other hand, significant intercorrelations also reflected the fact that a parent who shifted expectations for a contribution to the family in one area of home subsistence was also likely to shift expectations in another area. The three significant Spearman intercorrelations for shifts in expected contributions to family subsistence were .291 (cooking and laundry), .301 (cleaning and laundry), and .320 (cleaning and cooking).

Similarly, a parent who shifted expectations for increased responsibility for self-maintenance in one area also tended to shift expectations in another area.The three significant Spearman intercorrelations for shifts in expected contributions to self-maintenance were .155 (cooking and laundry), .194 (cleaning and laundry), and .148 (cleaning and cooking).

Although the skill involved – cooking, cleaning, or doing laundry – provided the tightest relations between variables (as seen in Table 2), our theoretically driven interests led us to create the following two indices.

2.4.4.2. Parent expectations of their children's contribution to family subsistence. The three items composing this index were parents' expectations that children would help with cooking for the family, cleaning common areas of the family home, and doing household laundry. We summed these three items to create a 7-point index which could range from -3 to +3, with scores above zero indicating that parents expected their children to help more with family subsistence activities since the start of the pandemic.

2.4.4.3. Parent expectations of their children's contribution to self-maintenance. The three items composing this index were parents' ex-

Table 2
Bivariate correlations between parent expectation variables.

Variables	1	2	3	4	5
1 Child cooks for family					
1 Child cooks for self	**.445** (<.001)				
1 Child cleans for family	**.320** (<.001)	**.340** (<.001)			
1 Child cleans own room	**.170** (.007)	**.148** (.021)	**.367** (<.001)		
1 Child does laundry for family	**.291** (<.001)	**.185** (.004)	**.301** (<.001)	**.319** (<.001)	
1 Child does own laundry	**.125** (.049)	**.155** (.015)	**.202** (.001)	**.194** (.002)	**.541** (<.001)

Note: Pearson correlations are bolded in the table. P-values are included in parentheses below correlations.

pectations that children would prepare some of their own meals, keep their own rooms clean, and do their own laundry. These 3 items were summed to create a 7-point index which ranged from -3 to +3; net scores above zero indicated that parents children to contribute more to self-maintenance during the pandemic than before.

2.5. Analysis

Our analysis revolved around answering two questions: 1) What shifts were experienced during the pandemic? 2) What factors predicted these shifts?

2.5.1. What shifts were experienced during the pandemic?

The question of what shifts were experienced during the pandemic was answered by a series of bootstrapped (5,000 samples) one-sample *t*-tests on the scale and index scores. The arithmetic construction of the seven scales was described in Section 2.4.3., with the construction of individual scales laid out in Sections 2.4.3.1, 2.4.3.2, 2.4.3.3. 2.4.3.4, 2.4.3.5, 2.4.3.6, and 2.4.3.7. The construction of the two indices is described in Section 2.4.4. We used bootstrapping to account for the nonormal responses on the scales. Bootstrapping, as a nonparametric approach, does not make any distributional assumptions when testing hypotheses or reporting confidence intervals for the means. For each t-test, the null hypothesis was no change.

We used an alpha of .001, in order to be conservative and to avoid inflating the probability of finding false positives, given the large number of tests that were run. Note, however, that directionality of effects was predicted in all cases, so two-tailed tests were another source of statistical conservatism. In addition, the fact that every prediction was confirmed by the data analysis (see the Results section) nullifies the idea that multiple tests are a source of random Type 1 error in this particular study.

2.5.2. What factors predicted these shifts?

This question concerned identifying contextual factors playing a role in shifts experienced during the pandemic. It was addressed by means of a structural equation model. In order to analyze the role of contextual variables, we combined respondents from the two states in order to have a large sample for structural equation modeling (N = 2092). In contrast, our subsample of parents was too small to yield a reliable structural equation model for parent expectations.

Our conceptualization on theoretical grounds was that survival concerns and days at home would be the major influences leading to a rise in subsistence activities, subsistence values, family activities, help given to family, help received from family, and acceptance of authority. All of these variables except days at home utilized the latent constructs that emerged from the factor analysis.

As described earlier, days at home was simply the number of days the respondent reported being in social isolation. We considered days at home to be a measure of social isolation of each household from the larger society. We thought that this would be another characteristic of a Gemeinschaft ecology that would influence the dependent variables – augmenting subsistence activities, subsistence values, the three family interdependence variables, and acceptance of authority.

2.5.2.1. Rural-urban residence. Although Gemeinschafts are rural, we did not expect this variable to be operative in the present environment in the U.S. The reason was that rural environments in the U.S. have almost all the qualities of a Gesellschaft ecology: They are commerce-based, high tech, and have ample opportunities for formal education. Another possible reason we thought the shifts would not be larger in rural environments was that, in a rural environment, the levels of all the dependent variables might already have had more Gemeinschaft values before the pandemic and therefore would shift less. Nonetheless, we explored this variable in statistical analysis. Using a binary rural-urban split where suburbs are classified with urban environments, we found that the rural-urban variable did not correlate significantly with any of the dependent variables. So it was not surprising that adding this variable to the model produced links to the dependent variables that were not statistically significant. Hence, we eliminated rural-urban residence from the model..

Knowing that rural areas are generally more conservative than urban, we can tentatively conclude from the lack of relationship of rural or urban residence with other variables that political views on the pandemic were not at play in our findings.

2.5.2.2. Age. It seemed plausible that more advanced age would be linked to larger shifts in survival concerns. However, this was not the case. Age was either uncorrelated or negatively correlated with survival concern variables. In terms of other variables, the COVID-prevention isolation of older people from their families could make shifts go against overall predictions – e.g., eating together could become less frequent. And, indeed, there is a significant negative correlation between age and

eating together. In general the correlations between age and the dependent variables were small and inconsistent in direction. For these reasons the variable of age was not included in the final model.

3. Results

3.1. Hypothesis: Concerns about mortality will become greater in the pandemic

3.1.1. California

Compared with before coronavirus, respondents reported thinking more about their own mortality; thinking more about the mortality of family members; thinking more about making concrete plans for when they die (e.g., making a will, where they would like to be buried or cremated); and thinking more about making concrete plans for when family members die. Based on both content and the factor analysis, a scale called survival concerns was composed of these four items. In California, the mean net change was 1.71 out of 4 items. A bootstrapped one-sample t-test showed this change to be significantly different from 0 (no change) ($t(1133) = 39.45$, CI[1.61, 1.79], $p < .001$; d =1.17.

3.1.2. Rhode Island replication

A bootstrapped one sample t-test was run on the data from Rhode Island. Survival concerns also significantly increased in Rhode Island ($M = 1.87$, $t(953) = 40.35$, CI[1.78, 1.96], $p < .001$; d =1.31.

3.2. Hypothesis: Governmental authority to restrict movement will become more acceptable in the pandemic

3.2.1. California

This hypothesis was also confirmed. Compared with before the pandemic, respondents felt it had become more acceptable for the government to restrict their movement and the movement of others: in California, the mean net change for this scale was 0.47 out of 2 items (bootstrapped one-sample t-test: t (1131) = 9.84, CI[0.38, 0.57], $p < .001$; $d = 0.27$).

3.2.2. Rhode Island replication

In RI there was also a significant increase in the acceptability of the government restricting movements (bootstrapped one-sample t-test: $M = 0.86$, $t(953) = 18.12$, CI[0.77, 0.96], $p < .001$; $d = 0.56$).

3.3. Hypothesis: Subsistence values will increase during the pandemic and stay-at-home

3.3.1. California

This hypothesis was strongly confirmed. Compared with before coronavirus and stay-at-home, subsistence values increased during the pandemic. This variable consists of five values that are prevalent in subsistence ecologies: appreciation of family, appreciation of the elderly, not wasting scarce resources, high importance of having enough money to satisfy basic needs for food and shelter, low importance of becoming rich. In California, the mean net change was 2.16 out of five items. A bootstrapped one-sample t-test showed this change to be significantly different from 0 (no change) ($t(1135) = 47.29$, CI[2.07, 2.24], $p < .001$; $d = 1.41$).

3.3.2. Rhode Island replication

In RI, subsistence values had also significantly increased (bootstrapped one-sample t-test: $M = 2.38$, $t(953) = 47.08$, CI[2.26, 2.46], $p < .001$; $d = 1.54$).

3.4. Hypothesis: Subsistence activities will increase during stay-at-home

3.4.1. California

This hypothesis was also strongly confirmed. The subsistence activities scale comprised three items: cooking, growing edibles (such as vegetables), and doing home maintenance. Respondents reported that they had increased these activities during stay-at-home to a statistically significant degree. The highest possible score was 3 (increase in all 3 subsistence items). The mean net change was 1.17 (boostrapped one-sample t-test: $t(1108) = 35.43$, CI[1.11, 1.24], $p < .001$, $d = 1.06$).

3.4.2. Rhode Island replication

The increase was also significant in Rhode Island (bootstrapped t-test: $M = 1.19$, $t(937) = 33.96$, CI[1.12, 1.26], $p < .001$, $d = 1.10$)

3.5. Hypothesis: Family interdependence: Family activities will increase

3.5.1. California

The scale of interdependent family activities was composed of two items. Compared with before stay-at-home, participants reported eating more often with others in their household and talking more to others in their household. In Calfornia, the net increase in this scale was positive change of 0.59 items out of 2 (bootstrapped one-sample t-test: $t(883) = 16.21$, CI[0.52, 0.66], $p > .001$); $d = 0.55$).

3.5.2. Rhode Island replication

In Rhode Island, family activities also increased as measured by a bootstrapped one sample t-test ($M = 0.75$, $t(768) = 20.05$, CI[0.68, 0.83], $p < .001$, $d = 0.72$).

3.6. Hypothesis: Family interdependence: Family help to respondent will increase

3.6.1. California

This scale was composed of two items. One concerned receiving family help for daily needs; one concerned receiving family help for social needs. As we predicted participants did experience more help from their family during the stay-at-home order. In California, the mean net change was 0.37 and this differed significantly from zero when a one-sample bootstrapped t-test was conducted ($t(1133) = 14.90$, CI[0.32, 0.42], $p < .001$, $d = 0.44$).

3.6.2. Rhode Island

In Rhode Island participants also reported receiving significantly more help from their families during the pandemic than before (bootstrapped t test: $M = 0.36$, $t(953) = 13.40$, CI[0.31, 0.41], $p < .001$, d = 0.43).

3.7. Hypothesis: Respondent's help to family will increase

3.7.1. California

The change in the amount of help participants were providing to their family was measured with two items. As with the family helping the participants, one item asked about help with daily needs and a second item asked about help with social needs. Participants reported receiving more help from their families than before the stay-at-home order. The mean net change was 0.51 (bootstrapped t-test: $t(1128) = 17.01$, CI[0.45, 0.57], $p < .001$, d = 0.51).

3.7.2. Rhode Island replication

In Rhode Island the mean net change was 0.55 (bootstrapped t-test: $t(945) = 16.50$, CI[0.49, 0.62], $p < .001$, d = 0.55).

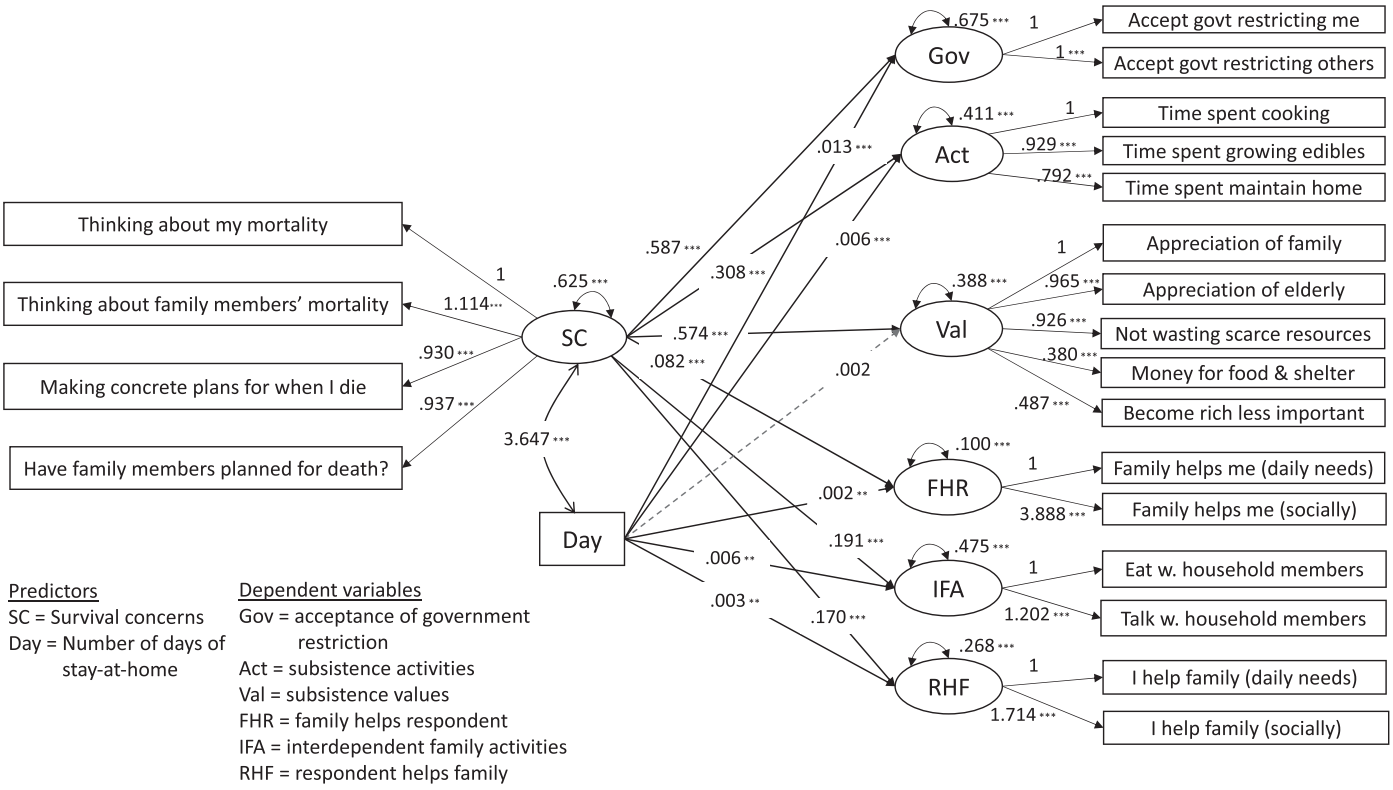

Fig. 1. Survival concerns and number of reported days of stay-at-home predict shifts experienced during the pandemic in values and behavior. Solid lines denote statistically significant links: ** $p < .01$; *** $p < .001$. A dotted line denotes the only nonsignificant link.

3.8. Contextual predictors of shifts during the pandemic

We analyzed a multiple-indicator multiple cause (MIMIC) model for the whole two-state sample (see Fig. 1). Individual items were treated as ordinal variables. The latent variable, survival concerns, and the manifest variable, number of days of stay-at-home, predicted six latent variables: subsistence activities, subsistence values, family activities, respondent helping family, family helping respondent, acceptance of authority/tightness. The model had an acceptable model fit: RMSEA (root mean square error of approximation) was 0.052 (the 90% confidence interval was [.050,0.055]), CFI (comparative fit index) was .940, and SRMR (standardized root mean square residual) was .048.

As hypothesized on theoretical grounds, the model in Fig. 1 shows that both survival concerns and the extent to which one has narrowed the social world to one's household (the days-at-home variable) predict greater acceptance of government authority, more subsistence activities, increases in mutual help between respondent and family, and more interdependent family activities. Increased survival concerns also predict increased subsistence values. Although in the predicted direction, the link from days at home to increased subsistence values is the one link that does not attain statistical significance.

The six dependent latent variables are correlated with each other. In order to make the graph simpler and clearer, those covariances and residual variances are not shown in the figure.

3.9. Hypothesis: Parents will expect children to make greater contributions to family and own subsistence

In the next two sections, we use bootstrapped one-sample *t*-tests to test the hypotheses that parents' expectations for children's contributions to family subsistence and parents' expectations for children's self maintenance would both increase during the pandemic, but the greater increase would be in expectations for contributions to the family. These two hypotheses and their tests are based on the theoretical discussion in Section 1.3.6 and the methodological discussion in Section 2.4.4.

3.9.1. California parents expectations for childrens' contribution to family subsistence

The hypothesis was strongly confirmed. A one-sample bootstrapped t-test comparing net change in expectations against the test value of zero (no change) showed that, on average, there was a significant positive change toward higher expectations of children's contributions to the household in California. The mean net change for parental expectations for contributions to family subsistence needs in California was 1.01 items (one-sample bootstrapped t-test: $t(108) = 10.09$, $p < .001$, CI[0.82, 1.22], $d = 0.966$). The mean net change of 1.01 indicates that, on average, parents now had greater expectations than before stay-at-home in one of the three areas of family subsistence.

3.9.2. Rhode Island replication

A similar effect was observed in Rhode Island. A one-sample bootstrapped t-test comparing net change in expectations against the test value of zero (no change) showed that, on average, there was a significant positive change toward higher expectations of children's contributions to the household in Rhode Island. The mean net change for parental expectations for contributions to family subsistence needs in Rhode Island was 0.69 (one sample bootstrapped t-test: t (144)= 8.58, CI[0.53, 0.85], p < .001, d = 0.71). What this figure means is that, on average, about two in three parents raised their expectations for children's contribution by one item.

3.9.3. California parents' expectations for children to contribute to self-maintenance

This hypothesis was also confirmed. A one-sample bootstrapped t-test comparing net change in expectations against the test value of zero (no change) showed that, on average, there was a significant positive

change toward higher expectations of children's contribution to self-maintenance.The mean net change for contributions to self-maintenance was 0.76 item out of 3 (one sample bootstrapped t-test: $t(108)= 8.35$, $p < .001$, CI[0.58, 0.94], $d = 0.80$).

3.9.4. Rhode Island replication

In Rhode Island, an increase in expectations for children to make contributions to own subsistence occurred during the pandemic as it had in California (one sample bootstrapped t-tes: $M = .57$, $t(144) = 7.73$, CI[0.42, 0.71], $p < .001$, $d = 0.64$).

3.9.5. Comparing shifting parent expectations for children's contibutions to family subsistence with shifting parent expectations for children's self-maintenance in California

In both areas, family subsistence and personal upkeep, the majority of California parents reported higher expectations for their children to contribute since stay-at-home and the pandemic. However, as expected on theoretical grounds, the larger shift to higher expectations during stay-at-home occurred for the more collectivistic set of expectations: expectations that children would contribute to family needs, not just their own (bootsrapped paired-samples t-test: Mean difference = .26, $t(108) = 3.06$, $p = .003$, [CI = 0.10, 0.43], $d = 0.29$).

3.9.6. Rhode Island replication

In Rhode Island, the shift was also larger for parents' expectations for increased family help than for increases in self-maintenance. The mean difference between the two sets of expectations was smaller than in California (Rhode Island: $M = .12$), so that the bootstrapped paired-sample t-test achieves the .05 level of significance only if one considers that directionality of difference was predicted and a bootstrapped one-tailed test is carried out ($t(144) = 1.76$, CI[-.013, 0.26], $p = .040$, $d = .15$).

4. Discussion

In 2020, we were living through a pandemic, with stay-at-home orders and radical life changes. Greenfield's Theory of Social Change, Cultural Evolution, and Human Development predicted that higher mortality rates, in concert with intensified household and neighborhood contact, plus reduced contact with acquaintances and strangers, would lead to predictable changes in many areas (Greenfield, 2009, 2016; Evers, Greenfield, & Evers, 2021). Specifically the theory predicted that survival concerns would augment and life would shift towards activities, values, relationships, and parenting expectations typical of self-contained small-scale rural subsistence environments with low life expectancy. Respondents in California and Rhode Island were surveyed during the coronavirus pandemic when they had been under stay-at-home orders for a little over a month.

The survey was done first in California where stay-at-home orders were given nine days before those in Rhode Island. We then carried out the survey in Rhode Island to test whether our findings would replicate and generalize to a state with different ecological characteristics: much smaller population, a different region of the country, and a more homogenous population. The replication provided strong support for our findings. At a time in psychology that the issue of replication is at the forefront of methodological discussion (Open Science Collaboration, 2015), this is a major strength of the study.

The experience of respondents in both states confirmed all the predicted shifts: intensified survival concern (e.g., thinking about one's own mortality); increased subsistence activities (e.g., growing food); augmented subsistence values (e.g., conserving resources); family interdependence (family activities, respondents helping family members, family members helping respondent); and parents expecting children to contribute more to family maintenance (e.g., by cooking for the family).

High mortality rates and social self-containment are characteristics of a Gemeinschaft ecology. During the coronavirus pandemic, both of these environmental features increased greatly in a sudden fashion. Our theory predicted that greater survival concerns and more days spent observing stay-at-home rules would lead to increased subsistence activities, higher subsistence values, and greater family interdependence. Based on reports of respondents in both California and Rhode Island, these predictions concerning theoretical links were virtually all confirmed by structural equation modeling.

These effects reflected huge and sudden ecological change. Under stay-at-home orders people had more time for home-oriented activities. Working from home released time spent commuting to work. Children no longer needed to be taken to school or to extra-curricular activities. Grocery stores became dangerous places to catch COVID-19, making vegetable gardens more appealing. Social engagements outside the household were curtailed. With more time spent at home, constant cooking and cleaning the home became a necessity. With remote schooling, both adults and children were home all day every day, eating meals prepared at home and carrying out virtually all their activities in the home environment. Under these condtions, children were both more needed to help with household tasks and, because they were at home, rather than at school or extracurricular activities, they were available to provide this help.

Our findings reveal a human response to ecological change - survival threat from COVID-19 plus emphasis on household as interacting unit. Earlier in human history, all humans lived in small groups in subsistence ecologies where they also needed to adapt to survival threats and family was the primary unit. Because our data reveal parallel adaptations occurring in only a few weeks during stay-at-home and the pandemic, we suggest that the human species is geared for the same adaptations when these conditions reappear. That is, activities, values, and relationships have shifted towards those found, today as in the past, in small, isolated, subsistence villages: people growing edibles, worry about having enough to eat, concern for conserving scarce resources, lack of interest in becoming rich, respect for elders, obedience to authority, importance of family, material interdependence of family members, and high parental expectations for children helping out at home.

The high conformity with stay-at-home orders in our sample implies that people were interacting with a smaller number of people. At the same time many were experiencing increased danger from COVID-19 – that is toward more Gemeinschaft conditions. When conditions shift back in the opposite direction, we expect human behavior to again shift in order to adapt to new conditions. However, based on Bianchi's (2014) research of long-term effects of the Great Recession, we expect a residue of these effects to last for those in our sample who were in emerging adulthood, ages 18-25,

4.1. Comparison of the Theory of Social Change, Cultural Evolution, and Human Development with other theoretical frameworks

We will show in this section that several other theories can predict a piece of our findings, but no other theory predicts all of our results. Notably, no other theory makes any prediction at all about subsistence activities. Greenfield's Theory of Social Change, Cultural Evolution, and Human Development is unique in predicting this very large behavioral shift during the pandemic.

4.1.1. Comparison with Greenberg's Terror Management Theory

Greenfield's theory was developed through many years of studying a village transitioning from short life expectancy to longer life expectancy, whereas Terror Management Theory is a philosophical explanation for the results of laboratory manipulations (Evers, 2020, unpublished manuscript). Changes in behavior predicted by Terror Management Theory come from participants seeking immortality, rather than actual survival, as in Greenfield's theory. Hence the term "survival concerns" was better suited to our theoretical framework. Closely related to this difference is the fact that variation in survival concerns in Greenfield's theory is expected to reflect variation in actual mortality rates, a prediction that will, as noted below, be tested in future

research. In sharp contrast, mortality salience in Terror Management Theory research reflects variation in laboratory manipulations (e.g., Greenberg et al., 1995).

Greenfield's theory states that when survival concerns increase, individuals shift their behavior and psychology closer to that typically found in subsistence ecologies. Terror Management Theory states that when one's mortality increases in salience, such debilitating anxiety results that individuals can only manage their fear by striving for symbolic immortality through identification with cultural values and institutions that will outlast them (Greenberg et al., 2014). These different rationales do lead to some similar predictions and and results. Terror Management Theory researchers have found that increasing mortality salience makes humans strengthen their connection to their families, augments their desire to provide help, and increases their acceptance of authority (Greenberg et al., 2014). We find that increased survival concerns, a subset of increased mortality salience, have the same effects (Evers, 2020, unpublished manuscript).

Hence, both theories make a few similar predictions concerning effects of increased mortality salience and survival concerns. However, Greenfield's theory can explain all the effects predicted by Terror Management Theory, but Terror Management Theory is unable to explain all effects predicted by Greenfield's theory (Evers, 2020, unpublished manuscript).

Most notably, increasing engagement in subsistence activities when death becomes more salient, found in the present study, is a way to enhance survival, not symbolic immortality. However, engaging in survival-oriented activities is central to the adaptive behavior and psychology typical of subsistence ecologies.

4.1.2. Comparison with Gelfand's tightness/looseness paradigm

Like the Theory of Social Change, Cultural Evolution, and Human Development, the tightness-looseness paradigm connects multiple levels – societal, cultural, and psychological. Also similar to the present theory, the tightness-looseness paradigm posits that change in one level can trigger ripple effects to other levels, resulting in cultural change (Gelfand et al., 2011). Applying this paradigm to the pandemic on March 13, 2020, the very beginning of the pandemic, Gelfand contrasted tight cultures, willing to have strict rules that constrain choices, with loose cultures that value freedom over constraining rules (Gelfand, 2020). She noted that "countries with the strongest laws and strictest punishments are those with histories of famine, warfare, natural disasters, and, yes, pathogen outbreaks. These disaster-prone nations have learned the hard way over centuries: Tight rules and order save lives. Meanwhile, cultures that have faced few threats – such as the United States – have the luxury of remaining loose. They understandably prioritize freedom over constraint" (Gelfand, 2020).

These statements in her editorial piece are backed up by a large-scale study of 33 nations (Gelfand et al., 2011). As a corollary, Gelfand notes that the increase of mortality threat in the form of a pathogen outbreak should increase willingness to accept strict rules; and she notes that such a shift occurred in the United States in response to the threats of World War II. However, she expresses hope rather than prediction that such a shift would again occur in this country in response to the pandemic. We found that this shift did in fact occur. In short, Gelfand's theory does not predict all the wide ranging behavioral and value changes that Greenfield's theory does, but focuses accurately on the element of authority.

4.1.3. Pathogen prevalence and close interaction with kin lead to cultural change in the balance of individualism and collectivism

Grossmann and Varnum (2015) found a positive correlation between pathogen prevalence and collectivism in the United States, measuring both family structure, practices, and value focus to assess collectivism. In a later study, Santos, Varnum, and Grossmann (2017), found a relationship between decreases in pathogen prevalence and increases in individualism around the world over a period of 51 years. Unlike our research team (this article and Evers et al, 2020), they have not explored whether temporal increases in pathogen prevalence lead to increases in collectivism, although that prediction is clearly implied.

Given that stay-at-home increases social interaction among family households, as we have found, then Newson and colleagues' research also becomes relevant (Newson et al., 2005, 2007). They find that close interaction with kin leads to more collectivistic values. We found that result too, in that both family interaction and family importance increased during the pandemic. Again, these approaches would lead to predicting one change, whereas Greenfield's theory successfully predicts multiple shifts during the pandemic.

4.2. Limitations, conclusion, and future direction

This is a study of the combined effects of survival threat (coronavirus pandemic) and reduced social world (stay-at-home). Even though our samples are large, it is not a study of the effects of coronavirus on populations as a whole. As one of our California respondents pointed out to us, our survey leaves out the coronavirus experience of essential workers and, in California, does not represent the ethnic diversity of the state. However, we have confidence in the generality of our findings because many have been replicated in a national study of social media (Evers et al., 2021). That study indexed activities and values by means of word frequencies. Word frequencies on Twitter, blogs, and internet forums were compared before and after Trump's declaration of a national emergency; findings were based on more than a half-billion data points. Note however that the social media study differed from this survey study in that it used words rather than participants as units of analysis.

That study complements the present research in yet another way. The present research is a study of the experience of change at a single point in time during the pandemic. Our prior article is, in contrast, a natural experiment in which the rise of mortality salience, collectivistic values, and subsistence activities during the pandemic was measured and compared before and during COVID. The replication of findings using two very different methods gives us confidence that our survey findings indicate actual change as well as experienced change. Hence we have confidence in the additional shifts, such as increases in family interdependence and changes in parent expectations, that the survey has revealed, shifts that could not be assessed in online behavior.

Another limitation is that, because we have data from only two states, we could not use state mortality rates at the time of the survey as a variable leading to differential survival concerns. In the future, we will be able to relate mortality salience online to actual COVID mortality rates in a cross-cultural study of the pandemic in the United States, Mexico, Indonesia, and Japan that is currently underway.

We have documented that activities, social practices, and values typical of socially isolated agricultural communities with high mortality rates occurred very rapidly in response to the coronavirus pandemic. However, these responses in the United States took place in a high-tech environment, not the low-tech environment of a subsistence village. As we have documented in another publication (Evers et al., 2021), even the augmentation of subsistence activities during the pandemic was reliant on being able to gain materials and information for vegetable gardening, cooking, and home repair on the Internet. This major environmental difference makes it all the more interesting that these basic human responses to survival threat and limited contact with strangers have been conserved throughout human history and cultural evolution. This conclusion suggests that such reactions are universal human responses that will be similar everywhere in response to the pandemic. To evaluate this idea, we are testing our conclusions from the United States in countries on three separate continents: Indonesia, Japan, and Mexico.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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